



## General

### Guideline Title

Diagnosis and treatment of respiratory illness in children and adults.

### Bibliographic Source(s)

Snellman L, Adams W, Anderson G, Godfrey A, Gravley A, Johnson K, Marshall P, Myers C, Nesse R, Short S. Diagnosis and treatment of respiratory illness in children and adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2013 Jan. 86 p. [194 references]

### Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Institute for Clinical Systems Improvement (ICSI). Diagnosis and treatment of respiratory illness in children and adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2011 Jan. 81 p.

## Regulatory Alert

### FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- [May 12, 2016 – Fluoroquinolone Antibacterial Drugs](#) : The U.S. Food and Drug Administration (FDA) is advising that the serious side effects associated with fluoroquinolone antibacterial drugs generally outweigh the benefits for patients with sinusitis, bronchitis, and uncomplicated urinary tract infections who have other treatment options. For patients with these conditions, fluoroquinolones should be reserved for those who do not have alternative treatment options.

## Recommendations

### Major Recommendations

Note from the National Guideline Clearinghouse (NGC) and the Institute for Clinical Systems Improvement (ICSI): For a description of what has changed since the previous version of this guidance, refer to [Summary of Changes Report -- January 2013](#) . In addition, ICSI has made a decision to transition to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. This

document is in transition to the GRADE methodology. Transition steps incorporating GRADE methodology for this document include the following:

- Priority placed upon available systematic reviews in literature searches.
- All existing High Quality Evidence (randomized controlled trials [RCTs]) studies have been considered as high quality evidence unless specified differently by a work group member.
- All existing Class B, C and D studies have been considered as low quality evidence unless specified differently by a work group member.
- All existing Class M and R studies are identified by study design versus assigning a quality of evidence. Refer to Crosswalk between ICSI Evidence Grading System and GRADE (see below in the "Definitions" section).
- All new literature considered by the work group for this revision has been assessed using GRADE methodology.

The recommendations for the diagnosis and treatment of respiratory illness in children and adults are presented in the [original guideline document](#) in the form of four algorithms with 53 components, accompanied by detailed annotations. Algorithms are provided for: Diagnosis and Treatment of Respiratory Illness in Children and Adults (main algorithm), Strep Pharyngitis, Non-Infectious Rhinitis, Bacterial Sinusitis. Clinical highlights and selected annotations (numbered to correspond with the algorithm) follow.

Class of evidence (Low Quality, Moderate Quality, High Quality, Meta-analysis, Systematic Review, Decision Analysis, Cost-Effectiveness Analysis, Guideline, and Reference) ratings are defined at the end of the "Major Recommendations" field.

### Clinical Highlights

- Patients and/or parents of children presenting or calling with symptoms suggestive of the common cold should be evaluated for other symptoms and the presence of more serious illness. (*Annotation #2, 4; Aim #1*)
- The primary treatment of viral upper respiratory infection is education based; education is to take place in the clinic, on the telephone, at the worksite, and in newsletters. Patients and/or parents should receive home care and call back instructions. (*Annotation #12; Aim #1*)
- Reduce unnecessary use of antibiotics. Antibiotic treatment should be reserved for a bacterial illness. (*Annotations #16, 20, 25, 27; Aim #2*)
- Diagnosis of group A beta streptococcal pharyngitis should be made by laboratory testing rather than clinically. (*Annotations #18, 25; Aims #2, 4*)
- Patients should be educated on strep pharyngitis including the importance of following the prescribed medication regimen, use of home remedies to relieve symptoms, actions to take if symptoms worsen, and the importance of eliminating close contact with family members or visitors to the home while group A beta streptococcal may be contagious. (*Annotations #20, 24, 27; Aim #4*)
- Prescribe intranasal steroids for moderate or severe allergic rhinitis. (*Annotation #34; Aims #5, 6*)
- Treat patients diagnosed as having allergic seasonal rhinitis with prophylactic medications and educate about avoidance activities. (*Annotation #34, 36; Aim #5*)
- Consider limited coronal computed tomography scan of sinuses and/or referral to ear, nose and throat clinician for patients when three weeks of antibiotic therapy has not produced a response in sinusitis treatment. (*Annotation #51*)

### Main Algorithm Annotations

#### 1. Patient Reports Some Combination of Symptoms

Patients may present for an appointment, call into a clinician to schedule an appointment or call a nurse line presenting with respiratory illness symptoms. The symptoms of respiratory illness may include sore throat, rhinorrhea, cough, fever, headache, and/or hoarseness.

#### 2. Are Symptoms Emergent?

Recommendation:

- Patients with upper airway obstruction, lower airway obstruction, altered responsiveness or severe headache should be seen immediately.

Recognizing the signs of a serious illness before it becomes life-threatening is usually the medical clinician's key concern. Patients should be assessed for upper airway obstruction, lower airway obstruction, severe headache and then the symptoms in Table 1 of the original guideline document, "Symptoms of Serious Illness." An important purpose of Table 1 is to assist clinicians and triage personnel in distinguishing between respiratory illness and more serious illness. The urgency index increases with the number and severity of symptoms. Symptoms in Table 1 indicate which patients presenting with respiratory illness symptoms need to be seen immediately by a clinician.

#### Upper Airway Obstruction

Patients with epiglottitis, croup or peritonsillar/retropharyngeal abscess may have signs of upper airway obstruction (stridor, air hunger, respiratory distress, toxic appearance, cyanosis, drooling with epiglottitis) and require immediate medical evaluation with combined ear, nose,

and throat/anesthesia management in emergency room or operating room setting.

Severe symptoms – including inability to swallow liquids, trismus, drooling without respiratory distress – should receive prompt evaluation by a physician within a reasonable amount of time, depending on the symptoms.

#### Lower Airway Obstruction

Lower airway obstruction signals an underlying condition different from respiratory illness. If moderate to severe distress is present, this suggests pneumonia, chronic obstructive pulmonary disease, asthma, foreign body, cardiac condition or other underlying conditions requiring specific evaluation and treatment in an intensive setting. Such symptoms indicate the need for urgent evaluation, and/or the need for intensive treatment, supplemental oxygen, and prolonged observation.

#### Severe Headache

Severe headache (usually described as the worst headache of their life) could indicate subarachnoid hemorrhage; complications of sinusitis such as cavernous sinus thrombosis or sphenoid sinusitis, meningitis, encephalitis or other conditions. Such symptoms require prompt, intensive evaluation and care.

#### 3. See Immediately

Use algorithm to triage patient symptoms; begin at algorithm box #6 (see the original guideline document), "Hoarseness, Cough or Nasal Symptoms Present?"

#### 4. Are Complicating Factors Present?

This guideline applies to patients in normal health and without severe complicating health factors.

Patients with complicating factors should consult with a clinician. The guideline should be applied with great care, if at all, to any adult or pediatric patients with complicating factors. A list of potential complicating factors, though not comprehensive, may include:

- Chronic illness/disease (congestive heart failure, chronic obstructive pulmonary disease, sickle-cell disease, etc.)
- Elderly
- History of rheumatic fever
- Human immunodeficiency virus positive
- Immunocompromised/immunosuppressed
- Patients on chemotherapy
- Asthma
- Diabetes
- Patient started antibiotics prior to diagnosis
- Treatment failure is defined as recurrence of symptoms within seven days of completing antibiotic therapy. Possible reasons include medication non-compliance, repeat exposure, antibiotic resistance, copathogen [*Guideline*].
- Pregnancy\*
- Recurrent streptococcal pharyngitis – recurrence of culture positive group A beta streptococcal pharyngitis more than seven days but within four weeks of completing antibiotic therapy
- Smokers
- Sore throat for more than five days duration
- Symptoms of whooping cough or recent exposure

\*This guideline should be applied with caution to pregnant women and underimmunized children.

Refer to the original guideline document for more information on complicating factors.

#### 7. Are Symptoms Suggestive of Non-Infectious Rhinitis?

Rhinitis is defined as inflammation of the membranes lining the nose and is characterized by nasal congestion, rhinorrhea, sneezing, and itching of the nose and/or postrnasal drainage [*Low Quality Evidence*].

Symptoms of non-infectious rhinitis include:

- Pruritus of the eyes, nose, palate, and ears
- Watery rhinorrhea
- Sneezing
- Nasal congestion

- Postnasal drip

#### 9. Are Symptoms Suggestive of Bacterial Sinusitis?

Symptoms include:

- Upper respiratory symptoms present 10-14 days
- One or more of the following factors present at a point of 10-14 days after onset:
  - Facial pain or sinus pain particularly if aggravated by postural changes or by Valsalva maneuver
  - Fever
  - Purulent nasal drainage

#### 11. Are Symptoms Suggestive of Viral Upper Respiratory Infection?

A viral upper respiratory infection (common cold) is a self-limited illness typically lasting up to 14 days manifested by rhinorrhea, cough, and fever.

Influenza is a viral upper respiratory infection and has the potential to be more serious and differentiated by degree of illness, impressive myalgia, and season, and should be treated early onset (<http://www.cdc.gov/flu/index.htm>). The symptoms may include general malaise, hoarseness, infection of the conjunctiva, decreased appetite, headache, and increased fussiness. Onset of symptoms is rapid. Fever, more commonly seen in children, usually lasts 1 to 3 days. Nasal discharge is initially clear and usually becomes yellow or green toward the end of the viral upper respiratory infection; this does not signify a bacterial infection and the patient does not need to be seen. The symptoms of a viral upper respiratory infection usually peak in 3 to 5 days and should resolve within 14 days. A mild cough may persist at night for 2 to 3 weeks.

There was consensus within the work group regarding the symptoms of the viral upper respiratory infection that are not indicative of more serious illness. Medical textbooks and a widely used self-care source also listed essentially the same constellation of symptoms.

For children:

It is not unusual for a child to have five to eight colds a year.

Children with viral upper respiratory infections have some combination of the following symptoms: nasal congestion and discharge, fever, sore throat, cough, hoarseness, mild fussiness or irritability, decrease in appetite, sleep disturbance, and mild eye redness or drainage [*Low Quality Evidence, Decision Analysis*].

It is essential to recognize symptoms that indicate an illness other than – or in addition to – pharyngitis, rhinitis, sinusitis, and viral upper respiratory infection that should be evaluated and treated (see Table 2 in the original guideline document).

#### 12. Patient Education/Home Care Call-Back Instructions

Recommendations:

- Patients, parents and caregivers should be educated on prevention, comfort measures and treatment recommendations for the common cold.
- Hand washing or use of hand sanitizers is recommended to prevent the spread of the common cold (viral upper respiratory infection) [*High Quality Evidence*].

Prevention

Although the viral upper respiratory infection is a respiratory illness, researchers have found that viral upper respiratory infections are spread more by hands of the person with a cold and by very close contact than by droplets in the air. Hand washing or use of hand sanitizers are the most effective way to prevent the spread of the common cold (viral upper respiratory infection) [*High Quality Evidence*]. Viral upper respiratory infection is most contagious at the onset of symptoms and while febrile [*High Quality Evidence*].

For infants and toddlers:

- Discourage visitors who have an acute illness, a fever, or contagious disease.
- Prevent child with viral upper respiratory infection from sharing toys and pacifier with other children and clean these items with soap and hot water as feasible to reduce opportunities for viral transmission.
- Use and teach good hand washing.
- Ask visitors to wash their hands before holding baby.
- Day care with three or more families represented is associated with higher incidence of viral upper respiratory infection, ear infections,

and lower respiratory infections, therefore:

- Check to see if staff and children at your child's day care are being taught good hand washing and other infection control measures (excellent educational materials are available that day care clinicians can obtain).
- Consider day care options that reduce exposure to other children
  - Relative or friend
  - In-home nanny shared by two families
- Encourage and support mothers to continue breastfeeding for an appropriate period because human milk contains ingredients that help protect babies from infections.

Refer to the original guideline document for information about comfort measures for infants/children and adults/adolescents.

## Treatment Recommendations

### *Antibiotics*

Antibiotics are effective only for treating bacterial infections. Because colds are viral infections, antibiotic use will not cure or shorten their length [*Systematic Review, Low Quality Evidence*].

Antibiotics cause side effects such as gastrointestinal discomfort, diarrhea, allergic reactions, diaper rash, and yeast infections. Unnecessary use of antibiotics can lead to the development of antibiotic-resistant strains of bacteria.

### *Over-the-Counter Medications*

Over-the-counter cold and cough medications and acetaminophen do not shorten the duration of viral upper respiratory infection.

#### *Children*

In April 2007 the Food and Drug Administration issued a warning on using cough and cold medicines in young children. Parents and other caregivers should only administer cough and cold medications to children under two when following the exact advice of their doctor. Clinicians should be certain that caregivers understand both the importance of administering these medications only as directed and the risk of overdose if they administer additional medications that might contain the same ingredient [*Low Quality Evidence*].

The Food and Drug Administration does not have approved dosing recommendations for clinicians prescribing cough and cold medications for children two and under [*Low Quality Evidence*].

Acetaminophen or ibuprofen may be suggested for home use because of the risk of Reye's syndrome associated with aspirin use in children.

The fever that frequently accompanies a viral upper respiratory infection in children is not harmful and is usually gone in 2 to 3 days. Parents/caregivers should be educated on fevers, signs, symptoms and treatment. It is the consensus of the work group that fevers persisting beyond 2 to 3 days should be evaluated by a clinician. Work group members also agree that infants under three months with fevers should be thoroughly evaluated. Fever can only be evaluated in the specific context of the whole illness and the accompanying circumstances. By itself, the magnitude of fever bears little or no relationship to the severity of the illness [*Low Quality Evidence*].

#### *Adults*

For adults with a cold, over-the-counter products such as nasal sprays, decongestants, saline nose drops, and analgesics may provide temporary relief of sore throat, runny nose, coughing, minor aches, and fever. Because of potential side effects, however, be sure to follow the recommended dosage and precautions. Patients who have high blood pressure, diabetes, thyroid disease or, who are pregnant should check with their physician regarding recommendations for decongestant use.

Use medication for discomfort as recommended by a physician or nurse for fever.

### *General Discomfort, Headache, and Fever Reduction*

Aspirin, ibuprofen and naproxen should be avoided by persons who are not eating well (risk of gastrointestinal upset), have a history of peptic ulcer or related disorder, have aspirin-sensitive asthma; and have renal dysfunction. For these reasons, plus the risk of Reye's syndrome associated with aspirin use in young, healthy children, acetaminophen should be suggested as the drug of choice. However, it should be used only as needed because of adverse effects.

In the adolescent/adult studies, the following drugs were found to reduce nasal symptoms: chlorpheniramine maleate, pseudoephedrine HCl, and oxymetazoline HCl [*Systematic Review*].

An intranasal anticholinergic (ipratropium bromide) is not effective when there is documented significant nasal obstruction. The cost/benefit relationship for ipratropium bromide nasal spray is rarely supportive for use of this medication. In addition, it requires physician intervention that consists of phone calls and/or office visits, which significantly increase the cost of care for a benign condition.

### *Echinacea*

Findings in the medical literature do not support the use of echinacea in preventing viral upper respiratory infection. Some preliminary data indicate that echinacea may shorten the course of viral upper respiratory infection; however, studies that produced this data are small. Methods by which echinacea is prepared are not standardized, and actual dose delivered by specific products varies widely. Hence, the work group cannot recommend the use of echinacea in preventing or shortening the duration of viral upper respiratory infection at this time. The work group will continue to evaluate the data on this and other herbal preparations [*Low Quality Evidence*], [*High Quality Evidence*].

### *Vitamin C*

There is no consistent evidence in the medical literature that high doses of vitamin C help shorten the course of viral upper respiratory infections. Hence, it was the consensus of the work group that high doses of vitamin C should not be recommended.

### *Zinc*

In adults there is some evidence that zinc gluconate may decrease the duration of a cold if started within 24 hours of onset; however, adverse reactions including nausea and bad taste may limit its usefulness. Zinc is not indicated and may be dangerous during pregnancy.

Intranasal zinc gluconate therapy can cause anosmia and is not recommended (<http://www.fda.gov/> ) [*Low Quality Evidence*].

According to the Cochrane Collaborative, overall results of studies of the effect of zinc gluconate on upper respiratory infection duration and severity have been inconclusive [*Systematic Review*].

Refer to the original guideline document for additional information on zinc.

### Call Back Instructions

#### *Children 3 Months to 18 Years of Age*

Call back if:

- Fever lasts three days or more
- Symptoms worsen after 3 to 5 days or if new symptoms appear (e.g., increasing symptoms of illness, lethargy, decreased responsiveness, poor eye contact, difficulty breathing)
- Symptoms have not improved after 7 to 10 days; it is not unusual, however, for a mild cough and congestion to continue 14 days or more

#### *Adults*

Call back if symptoms worsen after three to five days, new symptoms develop or symptoms do not improve after 14 days.

### 13. Are Symptoms Suggestive of Strep Pharyngitis?

Patients report a sore throat without rhinorrhea, cough, or hoarseness.

Patients with recent strep exposure may be more likely to have group A beta streptococcal pharyngitis.

Signs and symptoms associated with group A beta streptococcal include:

- Sudden onset of sore throat
- Exudative tonsillitis
- Tender anterior cervical adenopathy
- History of fever
- Headache in the setting of other symptoms noted above

- Abdominal pain in the setting of other symptoms noted above
- Absence of rhinorrhea, cough, hoarseness

Other symptoms sometimes associated with group A beta streptococcal pharyngitis include:

- Close exposure to strep throat (especially familial exposure)
- Vomiting
- Malaise
- Anorexia
- Rash (especially scarlatina) or urticaria

### Strep Pharyngitis Algorithm Annotations

#### 16. Patient Has Symptoms/Signs Suggestive of Strep Pharyngitis

Patients with recent strep exposure may be more likely to have group A beta streptococcal pharyngitis.

See Annotation #13, "Are Symptoms Suggestive of Strep Pharyngitis?" for the signs and symptoms associated with group A beta streptococcal pharyngitis.

Refer to the original guideline document for information on viral and bacterial causes of acute pharyngitis.

#### Complications Associated with Untreated Group A Beta Streptococcal

Rheumatic fever is a non-suppurative complication of group A beta streptococcal pharyngitis [*Low Quality Evidence*]. One reason for identifying and treating patients with group A beta streptococcal pharyngitis is to decrease the incidence of rheumatic fever [*Low Quality Evidence*]. The only controlled study demonstrating the possibility of preventing rheumatic fever was done in 1950 in military camps [*Low Quality Evidence*]. Further longitudinal studies have shown evidence of prevention of rheumatic fever by treatment of group A beta streptococcal with penicillin. Several studies have shown that treatment of patients with group A beta streptococcal pharyngitis shortens the course of the illness [*High Quality Evidence*], although it should be recognized that group A beta streptococcal pharyngitis is usually a self-limited disease, and fever and constitutional symptoms disappear spontaneously within three to four days of onset, even without antibiotic therapy [*Guideline*].

#### 17. History/Physical

History and physical findings may increase or decrease the likelihood of a group A beta hemolytic strep as the cause of pharyngitis. Factors increasing the likelihood include abrupt onset, associated fever, headache, abdominal pain in the setting of a sore throat (especially in children), presence of tonsillar exudate, primarily anterior cervical adenopathy, and the absence of cough, hoarseness, and nasal congestion. These findings are not specific enough for group A strep to allow empiric treatment without testing. On the other hand, lack of these physical findings and history may eliminate the need to do strep testing and focus treatment instead on symptomatic measures.

#### 18. Collect Specimen for Rapid Strep Test and Backup Culture

Rapid strep test and strep culture both require proper collection technique by trained professionals and must be performed according to the Federal Clinical Laboratory Improvement Act (CLIA) regulations. Poor collection procedures reduce accuracy of either test. Rapid strep test must also be performed according to the manufacturer's guidelines. An appropriately performed throat swab touches both tonsillar pillars and the posterior pharyngeal wall. The tongue should not be included (although its avoidance is sometimes technically impossible). Backup strep culture is needed if rapid strep test is negative, unless it has been ascertained that in a given practice the rapid strep test is comparable to a throat culture [*Guideline*]. Testing for rapid strep test and backup culture may require the use of separate swabs for each test.

Polymerase chain reaction (PCR) may also be used for primary testing or as a backup instead of plated culture.

Refer to the original guideline document for information on advantages and disadvantages of rapid strep test.

#### 20. Treatment and Education

##### Recommendations:

- Penicillin (PCN) is the drug of choice for treatment of culture positive cases of group A beta streptococcal pharyngitis. In children and patients unable to swallow pills, amoxicillin is an acceptable alternative due to the poor palatability of the penicillin suspension.
- In penicillin-allergic patients, options include cephalosporins (for some types of allergies), macrolides, and clindamycin. Consider reevaluating patient for carrier status. Although macrolides may be an acceptable alternative, clinicians should check their local resistance patterns.

## Alternative Medication Recommendations

- Macrolides
- Cephalexin
- Clindamycin
- Amoxicillin/clavulanate
- Rocephin

[*Low Quality Evidence*], [*High Quality Evidence*]

A discussion of referral criteria for tonsillectomy in patients with recurrent tonsillitis is outside the scope of this guideline. As a result, the work group suggests physicians refer to one or more sources that offer a detailed discussion of referral criteria [*Meta-analysis*], [*High Quality Evidence*].

Patients currently on antistreptococcal antibiotics are unlikely to have streptococcal pharyngitis. Antibiotics not reliably antistreptococcal include sulfa medications, nitrofurantoin and tetracycline.

Children may return to school 24 hours after antibiotic treatment has been started [*High Quality Evidence*].

### 21. Symptoms Improved Within 48-72 Hours?

After initiating a course of an appropriate antibiotic, improvement in symptoms related to group A streptococcal pharyngitis should be seen by 48 to 72 hours.

It is suggested that the patient be instructed to contact the clinician's office within 72 hours if symptoms do not improve.

### 22. Complete Treatment

It is important to emphasize to the patient that completion of the course of antibiotic is important to reduce risk of recurrence.

### 23. Consider Reevaluation

Strep Group A testing may, if positive, reflect a carrier state in which case the antibiotic used may not be effective. The prevalence of the carrier state has been estimated to vary between 10% and 25%. For this reason, if symptoms have not improved by 72 hours, there should be consideration of reevaluation of the patient. This may be needed particularly to exclude peritonsillar cellulitis or abscess, infectious mononucleosis, and especially in patients aged 15-30, the possibility of infection with the bacteria *Fusobacterium necrophorum* that can lead to a severe complication called Lemierre's syndrome. The causative organisms of peritonsillar cellulites and abscess are unlikely to be strep, and therefore an empiric change in antibiotic or referral to ear, nose, and throat clinician may be indicated. If clinically indicated, testing for mononucleosis may be appropriate, keeping in mind that screening tests for mononucleosis may not be positive until several days into the illness.

Patients who are chronically colonized with group A beta streptococcal are called carriers. These patients are at very low risk, if any, for developing suppurative (e.g., peritonsillar abscess) or non-suppurative (e.g., rheumatic fever) complications and are unlikely to spread group A beta streptococcal to close contacts. Therefore, most carriers require no medical intervention.

Two alternative treatment protocols have been established in the literature as effective in eliminating the carrier state. Clindamycin is the treatment of choice if the decision is made to treat the carrier state. If clindamycin is not a suitable therapeutic choice, consideration can also be given to penicillin/rifampin combination [*High Quality Evidence*].

Refer to the original guideline document for more information about the carrier state and Lemierre's syndrome.

Treatment of persistent infection should be directed toward eradication of both group A beta streptococcal and beta lactamase-producing protective organisms.

Note: All episodes consist of clinical findings and positive lab tests within 7 days after completion of a course of antibiotic therapy.

### 24. Education for Home Remedies

Recommendation:

- The patient should be instructed to call back if the symptoms worsen or if they persist beyond 5 to 7 days.

When a patient currently on antibiotics (other than sulfa, tetracycline, nitrofurantoin or other non-strep antibiotics) is taking the medication as prescribed and develops a sore throat, chances are that the sore throat is caused by something other than group A beta streptococcal.

Home remedies include the following:

- Take acetaminophen or ibuprofen. Do not use aspirin with children and teenagers because it may increase the risk of Reye's syndrome.
- Gargle with warm salt water (1/4 teaspoon of salt per 8 ounce glass of water).
- Adults or older children may suck on throat lozenges, hard candy, or ice.
- Eat soft foods.
- Drink cool beverages or warm liquids.
- Suck on flavored frozen desserts (such as popsicles).

Health education resources are listed in the Implementation Tools and Resources Table in the original guideline document.

## 25. Consider Strep Culture

If a rapid strep test is not available or the results are negative, a strep culture should be performed unless it has been ascertained that in a given practice the rapid strep test is comparable to a throat culture. Generally treatment should be delayed until the culture results are available. Results are usually available within 24 hours or slightly less, but may require incubation for longer periods of time. Some clinicians choose to initiate treatment prior to culture result availability, but a full course of treatment should not be prescribed until culture results confirm the presence of group A beta streptococcal [*Low Quality Evidence*].

A less satisfactory strategy is empiric treatment. Using complex clinical scoring systems or in patients with the complete constellation of classic strep symptoms, empiric treatment may be justified but has significant limitations. If full-course treatment is initiated without intent to rely on the test results, laboratory testing is redundant and wasteful. Routinely culturing and prescribing antibiotic treatment for asymptomatic family members is not recommended. Routinely reculturing patients after treatment with antibiotics is not recommended.

Treatment of group A beta streptococcal pharyngitis is accurate when based on rapid strep test or strep culture results. Even with elaborate clinical scoring systems, diagnostic accuracy (probability of group A beta streptococcal) is only 50%, increasing to 75% if white blood count results are included in decision-making. For this reason, empiric treatment is discouraged; several professional societies recommend treatment based solely on culture results.

Refer to the original guideline document for information on advantages and disadvantages of strep culture, short-term treatment awaiting culture, and empirical treatment [*Low Quality Evidence*].

## 26. Strep Culture Result?

Whether or not the test is positive, patients and their families want to know results as soon as possible so that they can appropriately plan for their needs.

- If negative, they need educational information and a planned course of action if they do not recover in a reasonable time frame or if they become more ill.
- If positive, patients want to be started on medication as rapidly as possible, primarily as a comfort or convenience issue and to reduce contagion. Rheumatic fever prophylaxis is likely satisfactory if started up to 9 days after the onset of illness [*Guideline*]. However, patients and parents may perceive any delay in initiation of treatment as poor service.

## 27. Educate on Non-Group A Beta Streptococcal Pharyngitis Symptoms

If the rapid strep test and/or the strep culture are negative, the patient needs to be educated on non-strep sore throats. This includes the duration of the symptoms, ineffectiveness of antibiotic treatment, and home remedies that will ease the symptoms. *The patient should be instructed to call back if the symptoms worsen or if they persist beyond 5 to 7 days.*

*The benefit of treating non-group A beta streptococcal bacterial pharyngitis with erythromycin is small and of borderline statistical significance. Because of the small effect and the risk of promoting drug resistance, the use of erythromycin for the treatment of non-group A beta streptococcal pharyngitis is not recommended [High Quality Evidence].*

Home remedies include the following:

- Eat soft foods.
- Drink cool beverages or warm liquids.
- Suck on flavored frozen desserts (such as popsicles).

Provide educational material about non-strep causes of sore throats and home remedies for the patient to take home. See Annotation #24, "Education for Home Remedies," for additional information. Health education resources are included in the Implementation Tools and Resources Table of the original guideline document.

## 28. Symptoms Improved?

Non-group A beta streptococcal pharyngitis would generally be expected to be improving over a period of a few days. Patients should be instructed to contact their clinician if symptoms are persisting.

29. Continue With Home Care

Home care measures to alleviate symptoms should be continued as needed. See Annotation #24, "Education for Home Remedies," for additional information.

30. Consider Reevaluation/Mono Testing, if Appropriate

See Annotation #23, "Consider Reevaluation" for details.

Non-Infectious Rhinitis Algorithm Annotations

32. History/Physical

Exposure to triggers in the environment is a crucial point in the history. Home, school, work, day care and other frequent exposures should be reviewed. Documentation of treatments used for rhinitis is important, as trial and error is often the only way to determine each patient's needs.

The following points in the history and physical are relevant to rhinitis.

History of Present Illness

- Congestion or obstruction
- Rhinorrhea (anterior nasal discharge)
- Pruritus of nose or eyes
- Sneezing
- Posterior nasal discharge with or without cough
- Sinus pressure/pain
- Snoring
- Episodic or seasonal or perennial symptoms; consider specific triggers\*
- Pregnancy
- Current medications such as topical decongestants, hormones, antihypertensives, antibiotics
- Current and previous treatments for rhinitis

Past Medical History

- History of trauma or facial/sinus surgery
- Relevant medical conditions: asthma, dermatitis, chronic sinusitis, chronic or recurrent otitis media
- History of polyps and aspirin/non-steroidal anti-inflammatory drug (ASA/NSAID) sensitivity

Family History

- Asthma
- Rhinitis
- Atopic dermatitis

Social and Environmental History

- Occupational exposures\*
- Home exposures\*
- Active and passive smoking exposures
- School exposures
- Illicit drug exposures

\*Refer to Appendix A, "Rhinitis Triggers," in the original guideline document.

Physical Examination

The physical exam can have any combination of signs noted. Swollen nasal turbinates (congestion), rhinorrhea, and pruritus tend to be the most common. Allergic conjunctivitis may also be present with red, watery, pruritic eyes.

Atrophic rhinitis is characterized by foul-smelling nasal crusting and sinus pain and is usually related to atrophy, excessive nasal and sinus surgery, radiation or one of several rare diseases such as Wegener's granulomatosis.

Refer to the original guideline document for details on physical examination.

### 33. Signs and Symptoms Suggest Allergic Etiology?

Refer to the original guideline document for description of signs and symptom suggestive of an allergic etiology, non-allergic rhinitis, or both.

### 34. Initiate Symptomatic Treatment/Allergen Avoidance/Medication Therapy

#### Symptomatic Treatment

If the clinical diagnosis is obvious, symptomatic treatment should be initiated. Symptomatic treatment includes both education on avoidance and medication therapy.

Avoidance Activities: Identifying avoidable allergens by skin test or radioallergosorbent test will enhance a patient's motivation to practice avoidance. Some avoidance activities require significant financial investment or substantial lifestyle changes by the patient. Before recommending such measures, it may be useful to recommend skin testing or limited radioallergosorbent test testing to confirm the diagnosis and to identify the specific allergen.

Refer to the original guideline document for information on house dust mites, changes to reduce mite exposure, pets, molds, and pollens.

#### Medication Therapy

As with the chronic use of any medications, special consideration of risk benefit may need to be given to elderly, fragile patients, pregnant women, athletes, and children.

The following medications are used for patients with allergic rhinitis:

- Corticosteroids
- Antihistamines
- Decongestants
- Cromolyn
- Anticholinergics
- Leukotriene blockers
- Ophthalmic medications

Refer to the original guideline document for detailed information on these medications.

#### Diagnostic Testing

The clinician may choose to conduct diagnostic testing at this point if the results would change management.

The following are recommended:

- Skin tests and radioallergosorbent tests: Skin tests and radioallergosorbent tests identify the presence of IgE (immunoglobulin E) antibody to a specific allergen. Clinical relevance is established when exposure to an allergen to which the patient has evidence of allergen-specific IgE (e.g., skin tests) causes symptoms consistent with an allergic reaction. There are two major reasons to consider allergy testing: to differentiate allergic from non-allergic rhinitis, and to identify specific allergens causing allergic rhinitis. A limited panel of two to four radioallergosorbent tests should be considered. If a greater number of specific allergens is to be identified, skin tests are the preferred diagnostic tests. Skin tests are faster, more sensitive and more cost effective. Skin tests require experience in application and interpretation, and carry the risk of anaphylactic reactions. Therefore, only specially trained providers should perform them. The precise sensitivity of specific IgE immunoassays such as radioallergosorbent tests compared with prick/puncture skin tests is approximately 70% to 75% [Guideline]. Therefore, skin tests are presently the preferred test for the diagnosing of IgE-mediated sensitivity [Guideline], [Low Quality Evidence].
- Nasal smear for eosinophils: Nasal smear may be a low-cost screening tool to detect eosinophils. While eosinophils may be present in both allergic and non-allergic rhinitis, eosinophilia predicts a good response to topical nasal corticosteroid medication. This test must be done during the actual symptomatic period to yield interpretable results [High Quality Evidence], [Low Quality].
- Other tests: Blood eosinophilia has little diagnostic value in the evaluation of nasal allergies and is generally not helpful in the differential diagnosis. Total IgE concentrations provide only modest information about the risk of allergic disease. According to the American Academy of Allergy and Immunology and the National Center for Health Care Technology, sublingual provocation testing is unproven and experimental. These tests are therefore not recommended [Low Quality Evidence]. A peripheral blood eosinophil count, total serum IgE level, Rinkel method of skin titration and sublingual provocation testing are not recommended [Guideline], [Low Quality Evidence].

### 35. Symptoms Improved?

If symptoms have not improved after 2 to 4 weeks, the clinician should consider issues affecting compliance, ongoing environmental triggers, alternative diagnosis, and alternative medication therapy.

### 36. Patient Education/Follow-Up As Appropriate

If the patient has adequate relief of rhinitis and associated allergic symptoms either by instituting avoidance measures or through a medication trial, appropriate follow-up should include:

- Further education and review of information about avoidance activities
- Education and review of appropriate use of medications and possible side effects
- Begin the use of medications prior to exposure when exposure to known allergens is anticipated and unavoidable. For example, in a patient with cat or dog sensitivity, taking oral antihistamines prior to visiting a home with a cat or dog can prevent symptoms. Starting intranasal corticosteroids 1 to 2 weeks prior to the start of the ragweed pollen season will maximize benefits of the medication in people with seasonal allergic rhinitis symptoms in the late summer.

Adequate follow-up may require a separate clinician visit or a follow-up phone call or may be accomplished during another clinic visit. Use of appropriate educational handouts and materials may be helpful. Children on steroids of any form should have height and weight checked regularly and plotted on the appropriate growth chart.

Patient education materials can be found in the Implementation Tools and Resources Table section of the original guideline document.

### 37. Consider Further Diagnostic Testing/Referral to Specialty Clinician

When the patient has not experienced relief of symptoms within 2 to 4 weeks of adequate therapy, the provider should:

- Review obstacles to compliance with current medication and discuss avoidance measures.
- Consider a trial of another medication or add another agent for targeted symptoms.
- Consider allergen skin testing by a qualified physician. If there are positive skin tests to allergens that correlate with the patient's timing of symptoms, immunotherapy may be considered.
- Consider complete nasal examination (rhinoscopy) by a qualified individual to rule out a mass or lesion, particularly if obstruction and congestion are the major symptoms.
- Consider diagnosis of non-allergic rhinitis.

#### Immunotherapy

Immunotherapy should be generally reserved for patients with significant allergic rhinitis for whom avoidance measures and pharmacotherapy are insufficient to control symptoms. Other candidates for immunotherapy include patients who have experienced side effects from medication or who cannot comply with a regular (or prescribed) pharmacotherapy regimen or who develop complications such as recurrent sinusitis.

All immunotherapy injections should be administered in a medical facility where personnel, equipment and medications are available to treat an anaphylactic reaction to an injection. Because there is a risk of anaphylaxis with every injection during the buildup or maintenance phases of treatment, regardless of the duration of treatment, the patient should be advised to wait in the physician's office or clinic for 30 minutes after the injection.

Patient education materials can be found in the Quality Improvement Support section of the original guideline document.

Immunotherapy injections are most effective for allergic rhinitis caused by pollens and dust mites. They may be less effective for mold and animal dander allergies [*Guideline*], [*Systematic Review*], [*High Quality Evidence*], [*Low Quality Evidence*].

### 38. Signs and Symptoms Suggest Structural Etiology

See original guideline document for suspected abnormalities that require a complete nasal examination including visualization of the posterior nasopharynx.

### 40. Non-allergic Rhinitis

Symptoms of non-allergic rhinitis are similar to those of allergic rhinitis and may include nasal congestion, postnasal drainage, rhinorrhea, and even sneezing. Examples of non-allergic rhinitis include hormonal, such as rhinitis of pregnancy; vasomotor rhinitis with sensitivity to smells and temperature changes; non-allergic rhinitis eosinophilic syndrome; rhinitis medicamentosa from regular use of topical nasal decongestants; and atrophic rhinitis.

### 41. Initiate Symptomatic Treatment

Treatment of obstructive symptoms due to non-allergic rhinitis includes the following:

- Azelastine hydrochloride nasal spray
- Intranasal corticosteroid spray
- Intranasal cromoglycate (cromolyn sulfate)
- Oral decongestant
- Nasal strips
- Topical antihistamines

*[High Quality Evidence]*

Treatment of symptomatic non-purulent chronic posterior nasal drainage (postnasal drip) includes the following:

#### Conservative Treatment

- Increase water intake
- Decrease caffeine and alcohol intake (both have a diuretic effect)
- Nasal saline irrigation. Nasal saline irrigations can be purchased over the counter. A saline nasal irrigation solution can be made at home by mixing 1/4 teaspoon table salt into one cup of water.
- Determine whether the patient is using any medications that may cause oral or nasal dryness.
- Petroleum jelly or antibiotic ointment may be used for nasal crusting.
- Add humidity in bedroom if significantly less than 50%.

#### Medical Treatment

- Intranasal corticosteroids

Treatment of symptomatic bilateral chronic anterior rhinorrhea due to non-allergic rhinitis includes the following:

- Avoidance of offending irritants such as smoke and perfume
- Intranasal corticosteroids
- Intranasal ipratropium bromide
- Nasal saline

#### 42. Symptoms Improved?

If symptoms have not improved within 2 to 6 weeks, the clinician should consider issues of compliance, alternative medical treatment, or referral to a specialty provider.

#### 43. Consider Referral to Specialist

Nasal examinations are generally done by an ear, nose, and throat specialist but may be done by a physician trained in endoscopic fiberoptic rhinoscopy. A limited computed tomography scan of the sinuses may be helpful at this time.

If chronic sinusitis remains in the differential diagnosis, a trial of antibiotic therapy should be completed prior to radiological examination.

#### Bacterial Sinusitis Algorithm Annotations

#### 45. Patient Has Symptoms Suggestive of Bacterial Sinusitis

The diagnosis of acute sinusitis is based primarily on the patient's presenting symptoms and history, and is supported by the physical exam. The duration of illness is key, as patients with less than 7 days of symptoms are very unlikely to have a bacterial cause.

Acute bacterial sinusitis has a high likelihood of being present with one of the following clinical presentations:

- Symptoms persist or signs of acute rhinosinusitis, that lasts 10 days or more without evidence of improvement, OR
- Symptoms are severe or patient has fever 102°F or more with purulent nasal discharge or facial pain that lasts for at least three to four consecutive days at onset of illness, OR
- Symptoms are worsening or new onset of fever, headache or increase in nasal discharge after a viral upper respiratory infection (VURI) that lasted five to six days and the patient was initially improving.

The gold standard for the diagnosis of acute bacterial sinusitis is sinus aspiration demonstrating high concentrations (>10,000 colony forming units/ml). However, sinus aspiration is not practical as a routine in clinical practice. In addition, studies have shown that radiographic studies of the sinuses of patients with viral upper respiratory infections and sterile sinus aspiration cultures, as well as studies of healthy children with no respiratory symptoms, are often abnormal. Thus, although normal radiographic studies may exclude sinusitis, abnormal studies, including

computed tomography (CT) scans and magnetic resonance imaging (MRI), are not sufficient for a diagnosis. With our current state of knowledge, the clinical presentation history serves as an accurate guide to the diagnosis of sinusitis, when applied rigorously [*Guideline*].

#### 47. History/Physical

##### Review History

- Fever greater than 102° and a documented past history of sinusitis in addition to previously noted symptoms in Annotation #45, "Patient Has Symptoms Suggestive of Bacterial Sinusitis," are supportive of a sinusitis diagnosis. Fever is typically present at the beginning of a sinus infection and persists approximately twice as long as with a viral upper respiratory infection [*Guideline*].
- Tooth pain not of dental origin is a more specific indication of sinusitis.
- Patients with severe symptoms should be evaluated in clinic and considered for treatment before 7 days.
- Known anatomical blockage (e.g., chronic nasal polyps, severely deviated septum, recurrent sinusitis) may need immediate treatment.
- Patients on antibiotics for 2 or more days, whose sinus symptoms are worsening, should be scheduled for a clinician visit.
- Patients may also describe worsening symptoms after initial improvement.

##### Phone Management

Phone care should be limited to a select group of patients with follow-up in the office if the patient does not respond to first-line antibiotics. This group includes patients with the following characteristics:

- Generally good health
- Mildly ill
- Established patient
- Age 16-75 years
- Patient is comfortable with phone management
- History of previous sinusitis treated successfully
- Earlier visit for treatment of viral upper respiratory infection

##### Physical Examination and Imaging

##### *Regional Exam of the Head and Neck*

The following physical findings may be present:

- Purulent nasal drainage
- Focal facial pain with bending forward (facial pressure or pain has a sensitivity of 52% and a specificity of 48%)
- Sinus tenderness
- Swollen turbinates
- Decreased transillumination (optional)
- Nasal polyps (nasal obstruction has a sensitivity of 41% and a specificity of 80%)

##### *Assess for Complicating Factors – More Intensive Treatment May Be Indicated*

- Local
  - External facial swelling/erythema over involved sinus
  - Involvement of frontal sinus or symptoms of sinus impaction
- Orbital
  - Visual changes
  - Extraocular motion abnormal
  - Proptosis
  - Periorbital inflammation/soft tissue edema
  - Periorbital erythema/cellulitis (subperiosteal abscess, orbital cellulitis, orbital abscess)
- Intracranial, central nervous system complications
  - Cavernous sinus thrombosis
  - Meningitis
  - Subdural empyema
  - Brain abscess

Patients with any one of the following complicating factors require emergent care:

- Orbital pain
- Visual disturbances

- Periorbital swelling or erythema
- Facial swelling or erythema
- Signs of meningitis or "worst headache of my life"

*[Low Quality Evidence]*

Plain sinus x-rays and other imaging tests are usually not necessary in making the diagnosis of acute sinusitis.

Refer to the original guideline document for more information on transillumination, plain sinus x-rays, and maxillary antrum aspiration.

#### 49. Home Self-Care

Patients who are in generally good health and only mildly ill may be appropriate candidates for home care/phone management of presumed acute sinusitis. Both the patient and the clinician should be comfortable with home care/phone management. The following factors are also supportive of home care/phone management:

- Established patient (has been seen by primary care physician within the past year)
- History of previous sinusitis treated successfully
- Earlier visit with viral upper respiratory infection that has progressed to probable acute sinusitis

The patient should be instructed to implement the following comfort and prevention measures:

##### *Home Self-Care Measures*

Maintain adequate hydration (drink 6 to 10 glasses of liquid a day to thin mucus)

Steamy shower or increase humidity in the home.

Apply warm facial packs (warm wash cloth, hot water bottle, or gel pack) for 5-10 minutes three or more times per day.

Localized pain and tenderness are common and may require analgesics.

Saline irrigation (saline nose drops, spray to thin mucus) can provide moisture and improve mucociliary function.

##### *Decongestants (Topically or Orally)*

- Pseudoephedrine HCl
- Decongestant nasal sprays for no longer than three days (e.g., oxymetazoline, phenylephrine HCl)

Refer to the original guideline document for additional information on decongestants.

##### *Antihistamines*

Antihistamines are not recommended for the treatment of sinusitis because they cause further inspissation of secretions *[Low Quality Evidence]*.

Get adequate rest

Sleep with head of bed elevated.

Avoid cigarette smoke and extremely cool or dry air.

##### *Prevention Measures*

Appropriate treatment of allergies and viral upper respiratory infections can prevent the development of sinusitis.

Environmental factors that affect the sinuses include cigarette smoke, pollution, swimming in contaminated water, and barotrauma.

#### 50. Treatment

The goal of treatment is to promote adequate drainage of the sinuses. This in turn will provide relief of symptoms associated with sinusitis. This may require a combination of home care and medical treatments.

##### Nasal Steroid Spray

Intranasal corticosteroid spray may be rational but is an unproved adjunctive therapy for acute sinusitis. The spray may be appropriate for selected cases of recurrent sinusitis, especially in the presence of an allergy or inflammation etiology *[High Quality Evidence]*.

## Adjunctive Therapy

Use of normal saline or hypertonic saline to irrigate the sinuses is now recommended as adjunct therapy with antibiotics, although the evidence is weak. Due to recent cases of infection, patients should be instructed to use saline or distilled water rather than tap water. Saline spray also can be used, especially for children who are likely to find irrigation objectionable. Oral decongestants, topical decongestants and antihistamines are not recommended as adjunctive therapy.

## Antibiotics

Antibiotics should be reserved for those patients who failed decongestant therapy, those who present with symptoms and signs of a more severe illness, and those who have complications of acute sinusitis [*Systematic Review, Low Quality Evidence*].

Amoxicillin clavulanate is now considered the first-line drug of choice according to the latest guideline from the Infectious Disease Society of America (IDSA). High-dose amoxicillin-clavulanate should be considered in situations where the patient has higher risk of resistance: age <2 years or >65 years, daycare participation, hospitalization within the past 5 days, prior antibiotics within the past month, immunocompromised patients, comorbidities, a local rate of *S. pneumoniae* resistance >10% or severe disease. Amoxicillin, trimethoprim-sulfamethoxazole and macrolides are no longer recommended as alternatives due to increasing resistance. In penicillin-allergic patients, doxycycline should be first line for older children or adults. Levofloxacin is an alternative that is recommended for children and adults by the IDSA. Second or third-generation cephalosporins are not recommended as mono-therapy by IDSA due to lack of coverage of penicillin-resistant *S. pneumoniae*. However, they can be used in conjunction with clindamycin, although palatability will be an issue for children with clindamycin liquid [*Guideline*].

[*Low Quality Evidence, High Quality Evidence*]

## Duration of Antibiotics

The duration of antibiotic therapy is controversial with recommendations from various sources being anywhere from 3 to 14 days. A 10-day course of antibiotics has commonly been recommended since this duration of antibiotics has been used in the vast majority of clinical trials in sinusitis. Also it has been shown that 10 days of antibiotics will achieve a bacteriologic cure as defined by follow-up sinus puncture. However, the IDSA now recommends shortening the course in adults to 5 to 7 days, while continuing to use the longer course in children [*Low Quality Evidence*].

## Call-Back Instructions

The patient should be instructed to call back if symptoms worsen, or if symptoms have not resolved within one week.

## 51. Treatment Failure?

### Complete Response

Patient is symptomatically improved to near normal.

### Partial Response

Patients who worsen in 48 to 72 hours after starting treatment or who are not responsive within 3 to 5 days warrant reevaluation. During reevaluation, consider whether the diagnosis is correct and if there is an underlying abnormality [*Guideline*].

Consider switching to a second-line antibiotic for another 48 to 72 hours.

Consider referral to a specialist (e.g., ear, nose and throat [ENT] or infectious disease [ID]).

Reinforce the comfort and prevention measures outlined in Annotation #49, "Home Self-Care."

### Failure or No Response

Patient has little or no symptomatic improvement after finishing a 10-day course of first-line antibiotic therapy.

An antibiotic that offers better coverage-resistant bacteria, such as high-dose amoxicillin/clavulanate, should be prescribed. After three to five days of failure of first-line antibiotic, an antibiotic should be prescribed that would cover potentially resistant bacteria occasionally seen in acute bacterial sinusitis. No randomized trials have been done supporting this practice. The work group, however, is aware that a substantial minority of patients will have infection from bacteria that are resistant in vitro to first-line therapy. Several studies have suggested that failure of therapy may be due to beta-lactamase producing organisms, anaerobes or staphylococci. It would seem reasonable,

therefore, to give a trial of a broader spectrum antibiotic in the setting of clinical failure [*Low Quality Evidence*].

One possibility is a second- or third-generation cephalosporin with intramuscular (IM) ceftriaxone for one to three days followed by an oral agent.

A fluoroquinolone with pneumococcal coverage may also be considered except for patients who are skeletally immature.

Refer to the original guideline document for information on second-line antibiotics and U.S. Food and Drug Administration (FDA) approved antibiotics.

Reinforce the comfort and prevention messages outlined in Annotation #49, "Home Self-Care."

#### Failure or No Response in 3 Weeks

In patients who have not responded to three weeks of continuous antibiotic therapy, consider limited coronal computed tomography scan of sinuses and/or referral to ear, nose and throat clinician and/or infectious disease specialist.

Please see individual health plan for formulary information.

#### Definitions:

Following a review of several evidence rating and recommendation writing systems, Institute for Clinical Systems Improvement (ICSI) has made a decision to transition to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system.

#### Crosswalk between ICSI Evidence Grading System and GRADE

ICSI GRADE System		Previous ICSI System
High, if no limitation		Class A: Randomized, controlled trial
Low		Class B: [observational] Cohort study
		Class C: [observational] Non-randomized trial with concurrent or historical controls
Low		Case-control study
Low		Population-based descriptive study
*Low		Study of sensitivity and specificity of a diagnostic test
*Following individual study review, may be elevated to Moderate or High depending upon study design		
		Class D: [observational] Cross-sectional study
Low		Case series
		Case report
Meta-analysis		Class M: Meta-analysis
Systematic Review		Systematic review

Decision Analysis ICSI GRADE System	Previous ICSI System	Decision analysis
Cost-Effectiveness Analysis		Cost-effectiveness analysis
Low	Class R:	Consensus statement
Low		Consensus report
Low		Narrative review
Guideline	Class R:	Guideline
Low	Class X:	Medical opinion

## Evidence Definitions

High Quality Evidence = Further research is very unlikely to change confidence in the estimate of effect.

Moderate Quality Evidence = Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.

Low Quality Evidence = Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate or any estimate of effect is very uncertain.

In addition to evidence that is graded and used to formulate recommendations, additional pieces of literature will be used to inform the reader of other topics of interest. This literature is not given an evidence grade and is instead identified as a Reference throughout the document.

## Clinical Algorithm(s)

Detailed and annotated clinical algorithms are provided in the [original guideline document](#)  for:

- Diagnosis and Treatment of Respiratory Illness in Children and Adults (main algorithm)
- Strep Pharyngitis
- Non-Infectious Rhinitis
- Bacterial Sinusitis

An additional algorithm titled "Patient Algorithm and Self-Care Measures" is provided in Appendix B of the original guideline.

## Scope

### Disease/Condition(s)

Respiratory illnesses:

- Viral upper respiratory infection
- Strep pharyngitis
- Non-infectious rhinitis (allergic and nonallergic)
- Bacterial sinusitis

## Guideline Category

Diagnosis

Evaluation

Management

Treatment

## Clinical Specialty

Allergy and Immunology

Family Practice

Infectious Diseases

Internal Medicine

Otolaryngology

Pediatrics

## Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Nurses

Physician Assistants

Physicians

Respiratory Care Practitioners

## Guideline Objective(s)

Overall Goal

To assist patients to be competent and comfortable with home care of respiratory illness, to assist medical personnel to differentiate respiratory illness from more severe illness, and to improve the appropriateness of care and antibiotic use for respiratory illness while decreasing the cost of that care

Aims

- To increase the percentage of patients diagnosed with viral upper respiratory infection who receive appropriate treatment
- To reduce excessive antibiotic treatment through decreased empiric treatment of patients with strep pharyngitis
- To increase the use of recommended first-line medications for patients with strep pharyngitis
- To increase patient/caregiver knowledge about strep pharyngitis and pharyngitis care
- To decrease the use of injectable corticosteroid therapy for patients with allergic rhinitis

## Target Population

Infants greater than three months, children, adolescents, and adults with respiratory illness who are in good health

## Interventions and Practices Considered

### Diagnosis

1. History and physical examination including assessment of symptoms
2. Evaluation by a provider for symptoms of a serious illness and complicating factors
3. Rapid strep test and strep culture
4. Skin tests and radioallergosorbent tests
5. Nasal smear
6. Differential diagnosis

### Treatment/Management

1. Patient, parent, and caregiver education
2. Comfort measures, including nasal suction for infants, steam or mist inhalation, nasal irrigation, adequate humidity, extra fluids
3. Medication therapy
  - Over-the-counter medications, including acetaminophen, nasal sprays, cold and cough medications
  - Zinc
  - Penicillin (alternatives: macrolides, cephalexin, clindamycin, amoxicillin/clavulanate, rocephin)
  - Corticosteroids
  - Antihistamines
  - Decongestants
  - Cromolyn sodium
  - Anticholinergics
  - Leukotriene receptor blockers
  - Ophthalmic medications
4. Nasal strips
5. Reevaluation
6. Allergen avoidance, including house dust mites, pets, indoor molds, outdoor pollens and molds, and other indoor pollutants
7. Home self-care
8. Referral to a specialist

## Major Outcomes Considered

- Rate of inappropriate antibiotic usage
- Cost of care
- Specificity, sensitivity, and predictive value of diagnostic tests
- Adverse effects of medications

## Methodology

### Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

A consistent and defined process is used for literature search and review for the development and revision of Institute for Clinical Systems

Improvement (ICSI) guidelines. The literature search was divided into two stages to identify systematic reviews (stage I), and randomized controlled trials, meta-analyses and other literature (stage II). Literature search terms used for this revision are respiratory tract infections, antimicrobial treatment, streptococcus, sinusitis, rhinitis and acute respiratory pharyngitis. The search of PubMed includes literature from June 2010 through June 2012.

## Number of Source Documents

Not stated

## Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

## Rating Scheme for the Strength of the Evidence

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*Low		Study of sensitivity and specificity of a diagnostic test
		*Following individual study review, may be elevated to Moderate or High depending upon study design
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In addition to evidence that is graded and used to formulate recommendations, additional pieces of literature will be used to inform the reader of other topics of interest. This literature is not given an evidence grade and is instead identified as a Reference throughout the document.

## Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

## Description of the Methods Used to Analyze the Evidence

Not stated

## Methods Used to Formulate the Recommendations

Expert Consensus

## Description of Methods Used to Formulate the Recommendations

New Guideline Development Process

A workgroup consisting of 6 to 12 members that includes physicians, nurses, pharmacists, other healthcare professionals relevant to the topic, and an Institute for Clinical Systems Improvement (ICSI) staff facilitator develops each document. Ordinarily, one of the physicians will be the leader. Most work group members are recruited from ICSI member organizations, but if there is expertise not represented by ICSI members, 1 or 2 members may be recruited from medical groups, hospitals, or other organizations that are not members of ICSI. Patients on occasion are invited to serve on work groups.

The work group will meet for seven to eight three-hour meetings to develop the guideline. A literature search and review is performed and the work group members, under the coordination of the ICSI staff facilitator, develop the algorithm and write the annotations and footnotes and

literature citations.

Once the final draft copy of the guideline is developed, the guideline goes to the ICSI members for critical review.

#### Revision Process of Existing Guidelines

ICSI scientific documents are revised every 12 to 24 months as indicated by changes in clinical practice and literature. For documents that are revised on a 24-month schedule, ICSI checks with the work group on an annual basis to determine if there have been changes in the literature significant enough to cause the document to be revised earlier or later than scheduled. For yearly reviewed documents, ICSI checks with every work group 6 months before the scheduled revision to determine if there have been changes in the literature significant enough to cause the document to be revised earlier than scheduled.

#### *Literature Search*

ICSI staff, working with the work group to identify any new pertinent clinical trials, systematic reviews, or regulatory statements and other professional guidelines, conduct a literature search.

#### *Revision*

The work group will meet for 1 to 2 three-hour meetings to review the literature, respond to member organization comments, and revise the document as appropriate. A second review by members is indicated if there are changes or additions to the document that would be unfamiliar or unacceptable to member organizations. If a review by members is not needed, the document goes to the appropriate steering committee for approval according to the criteria outlined above.

## Rating Scheme for the Strength of the Recommendations

Not applicable

## Cost Analysis

The guideline developers reviewed published cost analyses.

## Method of Guideline Validation

### Internal Peer Review

## Description of Method of Guideline Validation

### Critical Review Process

The purpose of critical review is to provide an opportunity for the clinicians in the member groups to review the science behind the recommendations and focus on the content of the guideline. Critical review also provides an opportunity for clinicians in each group to come to consensus on feedback they wish to give the work group and to consider changes necessary across systems in their organization to implement the guideline.

All member organizations are expected to respond to critical review guidelines. Critical review of guidelines is a criterion for continued membership within the Institute for Clinical Systems Improvement (ICSI).

After the critical review period, the guideline work group reconvenes to review the comments and make changes, as appropriate. The work group prepares a written response to all comments.

### Document Approval

Each document is approved by the Committee for Evidence-Based Practice (CEBP).

The committee will review and approve each guideline/protocol, based on the following criteria:

- The aim(s) of the document is clearly and specifically described.
- The need for and importance of the document is clearly stated.
- The work group included individuals from all relevant professional groups and had the needed expertise.
- Patient views and preferences were sought and included.
- The work group has responded to all feedback and criticisms reasonably.
- Potential conflicts of interest were disclosed and do not detract from the quality of the document
- Systematic methods were used to search for the evidence to assure completeness and currency.
- Health benefits, side effects, risks and patient preferences have been considered in formulating recommendations.
- The link between the recommendation and supporting evidence is clear.
- Where the evidence has not been well established, recommendations based on community practice or expert opinion are clearly identified.
- Recommendations are specific and unambiguous.
- Different options for clinical management are clearly presented.
- Clinical highlights and recommendations are easily identifiable.
- Implementation recommendations identify key strategies for *health care systems* to support implementation of the document.
- The document is supported with practical and useful tools to ease *clinician* implementation.
- Where local resource availability may vary, alternative recommendations are clear.
- Suggested measures are clear and useful for quality/process improvement efforts.

Once the document has been approved, it is posted on the ICSI Web site and released to members for use.

## Evidence Supporting the Recommendations

### Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for selected recommendations (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Accurate diagnosis and appropriate treatment of respiratory illness

### Potential Harms

#### Disadvantages of Diagnostic Tests

- Rapid strep test has the following disadvantages or limitations:
  - Lab costs are increased.
  - Current technology requires that negative rapid strep tests be backed up with strep culture because of relatively low sensitivities, unless it has been ascertained that in a given practice the rapid strep test is comparable to a throat culture
  - Recent study indicates the utility of a real-time polymerase chain reaction (PCR) assay as a replacement for both rapid antigen testing and culture. The PCR method requires a minimum of 30 to 60 minutes to perform the test, and in order to be used efficiently, it would require batch testing. When PCR testing is used, a backup plated culture is not necessary.
  - Clinics may need to arrange patient flow in the office and need to determine who will perform rapid strep test.
  - False-positives may occur with retesting for up to 14 days following antibiotic course completion (presumably due to incomplete clearing of strep antigen fragments that are still detected after clinical recovery).
  - It does not differentiate between illness and carrier states.
- Skin tests require experience in application and interpretation, and carry the risk of anaphylactic reactions.

#### Adverse Effects Associated with Medications

- Over-the-counter decongestants have potential side effects. Adverse effects of oral decongestants include irritability, insomnia, and palpitations. The use of oral decongestants may cause central nervous system stimulation, hypertension, and cardiac arrhythmias. Patients who have high blood pressure, diabetes, thyroid disease or who are pregnant should check with their physician regarding recommendations for decongestant use. Both oral and topical decongestants should be used with caution in older adults, children under the age of six, and in patients of any age who have a history of any of the following: arrhythmia, angina, cerebrovascular disease, high blood pressure, bladder neck obstruction, glaucoma or hyperthyroidism.
- Parents and other caregivers should only administer cough and cold medications to children under two when following the exact advice of their doctor.
- Antibiotics cause side effects such as gastrointestinal discomfort, diarrhea, allergic reactions, diaper rash, and yeast infections. Unnecessary use of antibiotics can lead to the development of antibiotic-resistant strains of bacteria.
- Aspirin use in children is associated with Reye's syndrome.
- The most common side effects of intranasal corticosteroids are nasal irritation (dryness, burning and crusting) and mild epistaxis. Nasal septal perforation has been reported. Growth suppression was detected in children with perennial allergic rhinitis treated with intranasal beclomethasone dipropionate (no longer available) for one year. There is less data about preschool-aged children, so more caution should be used in this age group.
- Common side effects of the first-generation antihistamines include somnolence, diminished alertness and anticholinergic effects such as dry mouth, blurred vision and urinary retention. They can also cause central nervous system impairment and impair driving performance. The anticholinergic side effects of the first-generation antihistamines are of more concern in people over 65 years old. The second-generation antihistamines are less sedating and cause less central nervous system impairment because they do not cross the blood brain barrier well. Side effects of topical antihistamines include drowsiness and bitter taste.
- Adverse effects of cromolyn are minimal and include nasal irritation, sneezing, and unpleasant taste.
- The most frequent side effects of intranasal anticholinergics (ipratropium bromide) include epistaxis, blood-tinged mucus, and nasal dryness. Other possible side effects include dry mouth and throat, dizziness, ocular irritation, blurred vision, precipitation or worsening of narrow angle glaucoma, urinary retention, prostatic disorders, tachycardia, constipation, and bowel obstruction.
- Headache is the most commonly reported side effect of leukotriene blockers (montelukast). Events such as insomnia, agitation, depression and suicidal ideation are listed as precautions in the package labeling and should be monitored.
- Side effects of ophthalmic medications (except corticosteroids) are generally mild and include a brief stinging burning sensation. Care must be taken in the use of decongestant containing drops as they may cause rebound erythema (medicamentosa) when discontinued.
- All immunotherapy injections should be administered in a medical facility where personnel, equipment and medications are available to treat an anaphylactic reaction to an injection. Because there is a risk of anaphylaxis with every injection during the buildup or maintenance phases of treatment, regardless of the duration of treatment, the patient should be advised to wait in the physician's office or clinic for 30 minutes after the injection.
- Adverse reactions to zinc include nausea and bad taste may limit its usefulness. Zinc is not indicated and may be dangerous during pregnancy.
- Side effects of topical nasal steroid sprays seem to be related to application of the spray and are usually limited to intranasal dryness, crusting, and bleeding. Documented systemic side effects are rare.

## Contraindications

### Contraindications

- Aspirin, ibuprofen and naproxen should be avoided by persons who are not eating well (risk of gastrointestinal upset), have a history of peptic ulcer or related disorder, have aspirin-sensitive asthma, and have renal dysfunction.
- As with the chronic use of medications, special considerations of risk benefit may need to be given to elderly, fragile patients, pregnant women, athletes, and children.

## Qualifying Statements

### Qualifying Statements

- The information contained in this Institute for Clinical Systems Improvement (ICSI) Health Care Guideline is intended primarily for health

professionals and other expert audiences.

- This ICSI Health Care Guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. Patients and families are urged to consult a health care professional regarding their own situation and any specific medical questions they may have. In addition, they should seek assistance from a health care professional in interpreting this ICSI Health Care Guideline and applying it in their individual case.
- This ICSI Health Care Guideline is designed to assist clinicians by providing an analytical framework for the valuation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition.

## Implementation of the Guideline

### Description of Implementation Strategy

Once a guideline is approved for general implementation, a medical group can choose to concentrate on the implementation of that guideline. When four or more groups choose the same guideline to implement and they wish to collaborate with others, they may form an action group.

In the action group, each medical group sets specific goals they plan to achieve in improving patient care based on the particular guideline(s). Each medical group shares its experiences and supporting measurement results within the action group. This sharing facilitates a collaborative learning environment. Action group learnings are also documented and shared with interested medical groups within the collaborative.

Currently, action groups may focus on one guideline or a set of guidelines such as hypertension, lipid treatment, and tobacco cessation.

Detailed measurement strategies are presented in the original guideline document to help close the gap between clinical practice and the guideline recommendations. Summaries of the measures are provided in the National Quality Measures Clearinghouse (NQMC).

#### Implementation Recommendations

Prior to implementation, it is important to consider current organizational infrastructure that address the following:

- System and process design
- Training and education
- Culture and the need to shift values, beliefs and behaviors of the organization

The following system changes were identified by the guideline work group as key strategies for health care systems to incorporate in support of the implementation of this guideline.

- Develop, collect and disseminate materials to educate patients with allergic rhinitis about avoidance activities.
- Develop phone- or computer-based care for established patients that includes telephone nurse assessment, symptomatic care with follow-up instructions and use of a protocol to prescribe first-line antibiotics for sinusitis.

### Implementation Tools

Clinical Algorithm

Quality Measures

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

### Related NQMC Measures

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with a viral upper-respiratory infection who do not receive an antibiotic.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients and/or parents of children with a viral upper-respiratory

infection who receive home treatment education.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with strep pharyngitis who had a rapid group A strep test or strep culture.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with strep pharyngitis, and prescribed antibiotics, who had a negative culture or no rapid group A strep test or strep culture.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with strep pharyngitis prescribed first-line medications for strep pharyngitis.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients with strep pharyngitis prescribed antibiotics with documentation of education on 24-hour treatment prior to returning to work, school or day care.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with strep pharyngitis prescribed antibiotics with documentation of being educated on taking the complete course.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with strep pharyngitis instructed on actions to take if symptoms worsen.

Diagnosis and treatment of respiratory illness in children and adults: percentage of patients diagnosed with seasonal allergic rhinitis being treated with injectable corticosteroids.

## Institute of Medicine (IOM) National Healthcare Quality Report Categories

### IOM Care Need

Getting Better

### IOM Domain

Effectiveness

Patient-centeredness

## Identifying Information and Availability

### Bibliographic Source(s)

Snellman L, Adams W, Anderson G, Godfrey A, Gravley A, Johnson K, Marshall P, Myers C, Nesse R, Short S. Diagnosis and treatment of respiratory illness in children and adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2013 Jan. 86 p. [194 references]

### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

## Guideline Developer(s)

Institute for Clinical Systems Improvement - Nonprofit Organization

## Guideline Developer Comment

The Institute for Clinical Systems Improvement (ICSI) is comprised of 50+ medical group and hospital members representing 9,000 physicians in Minnesota and surrounding areas, and is sponsored by five nonprofit health plans. For a list of sponsors and participating organizations, see the [ICSI Web site](#) .

## Source(s) of Funding

- The Institute for Clinical Systems Improvement (ICSI) provided the funding for this guideline. The annual dues of the member medical groups and sponsoring health plans fund ICSI's work. Individuals on the work group are not paid by ICSI, but are supported by their medical group for this work.
- ICSI facilitates and coordinates the guideline development and revision process. ICSI, member medical groups, and sponsoring health plans review and provide feedback but do not have editorial control over the work group. All recommendations are based on the work group's independent evaluation of the evidence.

## Guideline Committee

Respiratory Steering Committee

## Composition of Group That Authored the Guideline

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## Financial Disclosures/Conflicts of Interest

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In 2010, the ICSI Conflict of Interest Review Committee was established by the Board of Directors to review all disclosures and make recommendations to the board when steps should be taken to mitigate potential conflicts of interest, including recommendations regarding removal of work group members. This committee has adopted the Institute of Medicine Conflict of Interest standards as outlined in the report *Clinical Practice Guidelines We Can Trust* (2011).

Where there are work group members with identified potential conflicts, these are disclosed and discussed at the initial work group meeting. These members are expected to recuse themselves from related discussions or authorship of related recommendations, as directed by the Conflict of Interest committee or requested by the work group.

The complete ICSI policy regarding Conflicts of Interest is available at the [ICSI Web site](#) .

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Guideline Related Activities: None  
Research Grants: None  
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Guideline Related Activities: ICSI Preventive Services Guideline  
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## Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Institute for Clinical Systems Improvement (ICSI). Diagnosis and treatment of respiratory illness in children and adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2011 Jan. 81 p.

## Guideline Availability

Electronic copies: Available from the [Institute for Clinical Systems Improvement \(ICSI\) Web site](#) .

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: [www.icsi.org](http://www.icsi.org) ; e-mail: [icsi.info@icsi.org](mailto:icsi.info@icsi.org).

## Availability of Companion Documents

The following is available:

- Diagnosis and treatment of respiratory illness in children and adults. Executive summary. Bloomington (MN): Institute for Clinical Systems Improvement; 2013 Jan. 2 p. Electronic copies: Available from the [Institute for Clinical Systems Improvement \(ICSI\) Web site](#) .

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: [www.icsi.org](http://www.icsi.org) ; e-mail: [icsi.info@icsi.org](mailto:icsi.info@icsi.org).

## Patient Resources

None available

## NGC Status

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